VTX Software Update

what's new since December

Sasha Lebedev, ISU

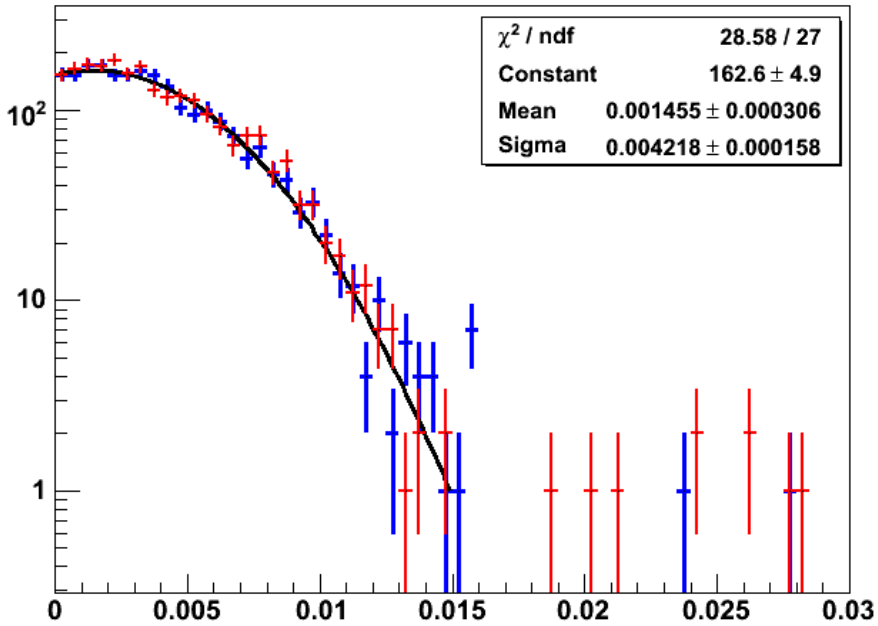
- Geometry and Detector response

- Charm/Bottom separation studies

VTX Monthly Meeting, February 10, 2009

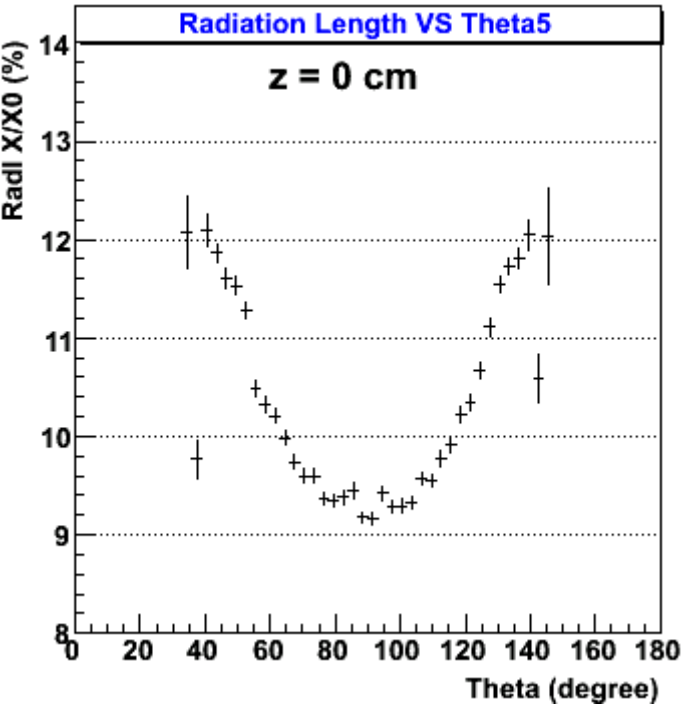
Geometry (1)

- Maki Kurosawa tested configuration with thicker beampipe
- no visible increase in rad. legth, no DCA resolution deterioration

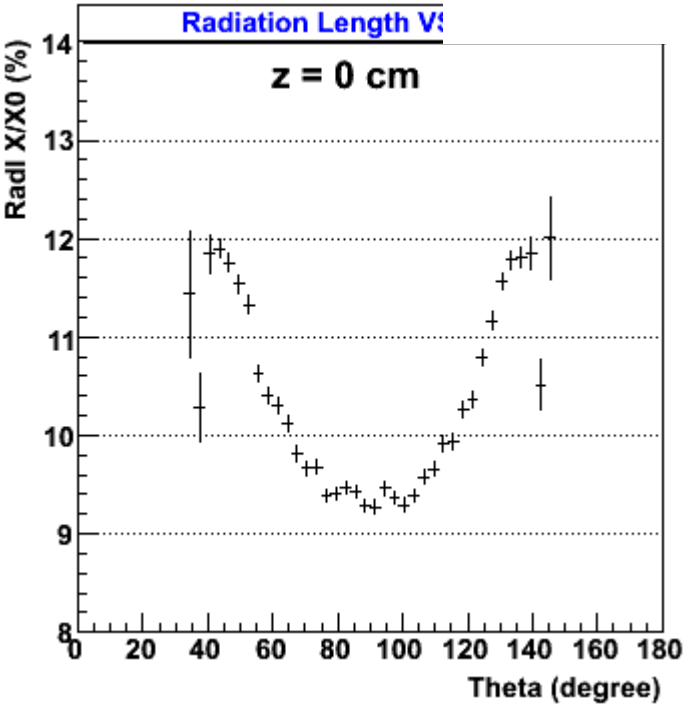


DCA in cm

Red – thin
Blue – thick
Black – fit to blue



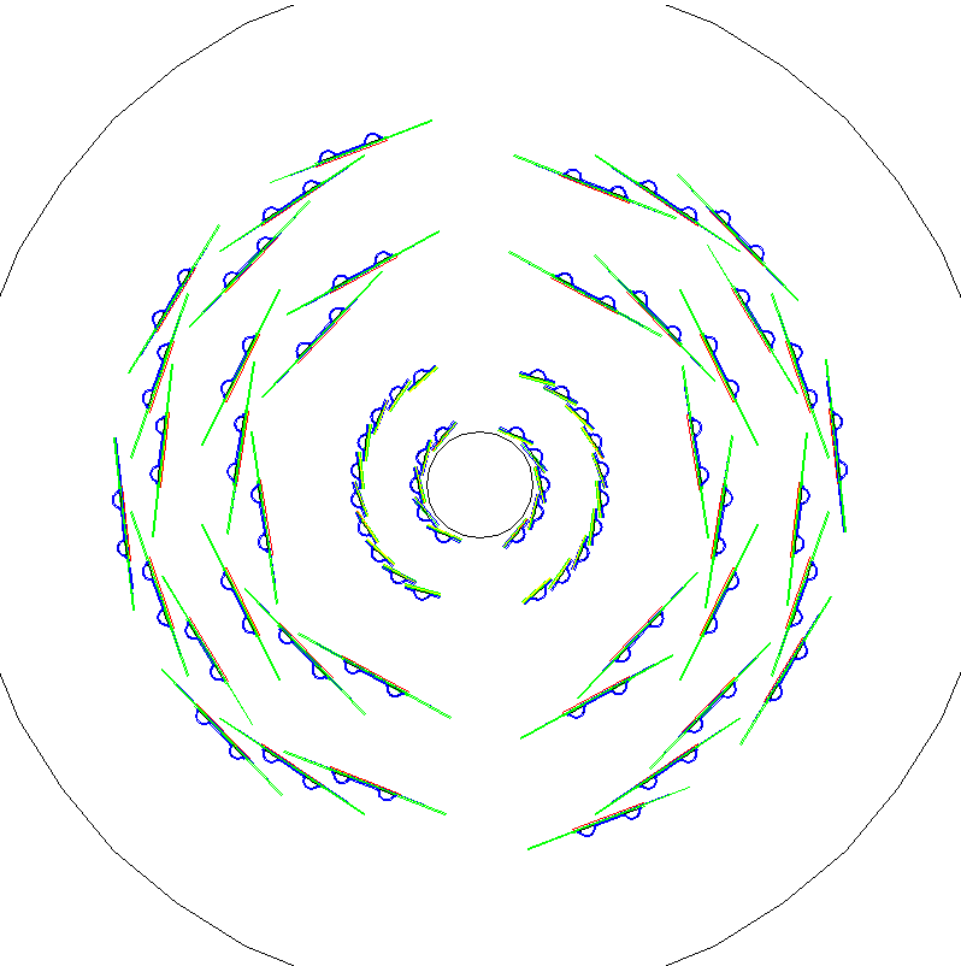
0.02 inch beampipe



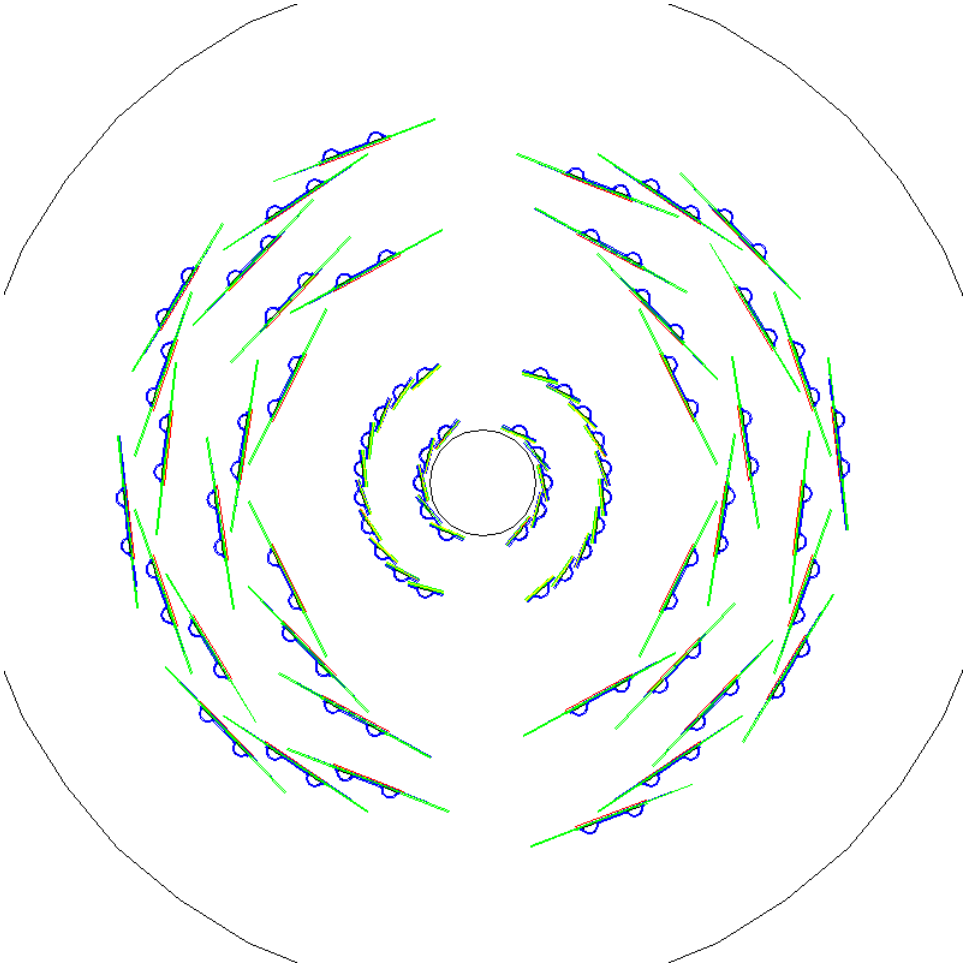
0.03 inch beamipe

Geometry (2)

- Reversed staggering angles in layer 3 (Maki)



Old geometry



New geometry

Detector response and other issues

- Kenichi Nakano and Manabu Togawa finishing detector response
  - Clustering and charge sharing in pixel layers done,
    to be committed to CVS next week after testing

- Remaining detector response items:
  - charge sharing in z direction in stripixels
  - charge diffusion (electron cloud is 4.5μm vs 50/80 μm pixels/strips)

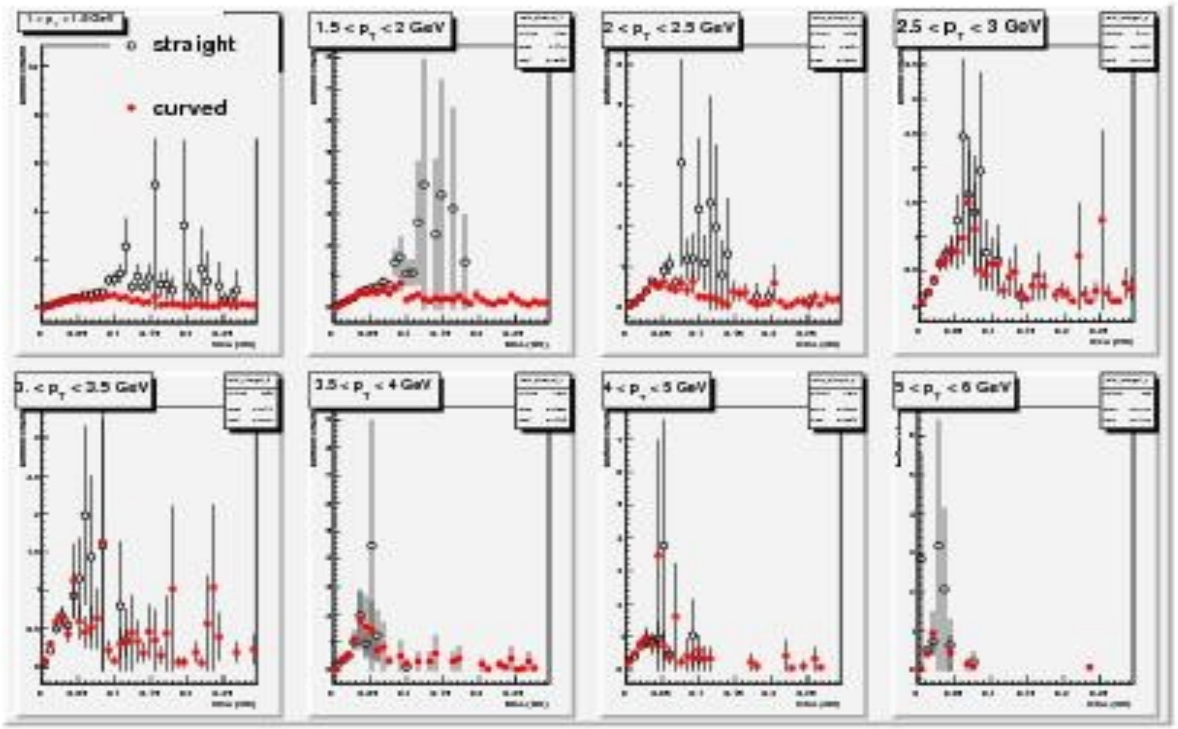
- Work on new global tracking by Songyan Xu (ISU student) and Alan Dion
  - encouraging results with using momentum space

- Standalone tracking to be finalized after QM09 (Alan)

Charm/Bottom separataion using DCA (1)

Richard Petti

- DCA is calculated using VTX clusters in two pixel layers
- cluster association using Geant info
- both straight line and curved projections (see yesterday's e-mail)



Red- curved projections, black – straight line

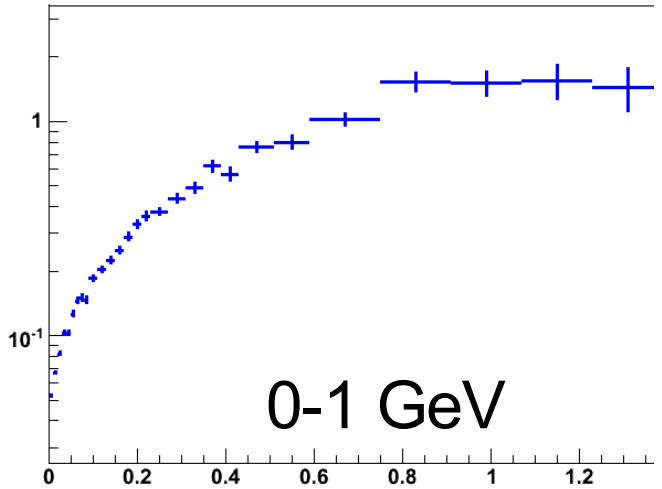
Charm/Bottom separtaion using DCA (2)

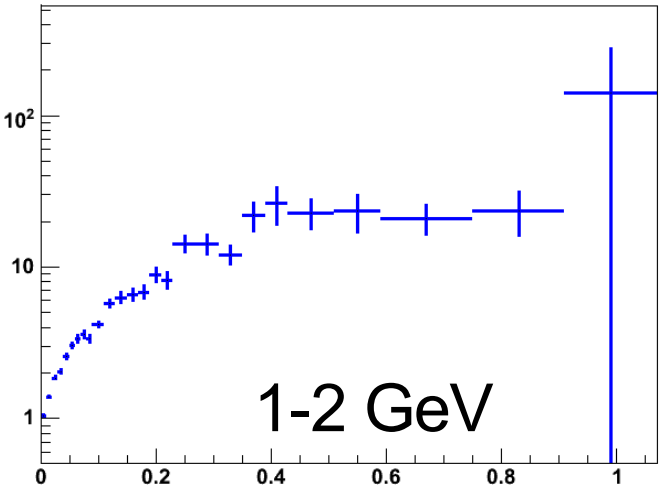
Sasha Lebedev

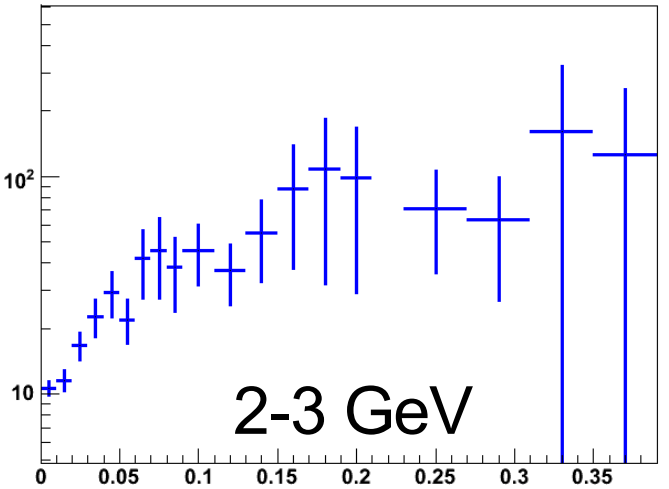
- DCA is calculated using VTX clusters in two pixel layers AND Kalman Fit (global tracking info)
- cluster association using global tracking (cgl),
- straight line projections.

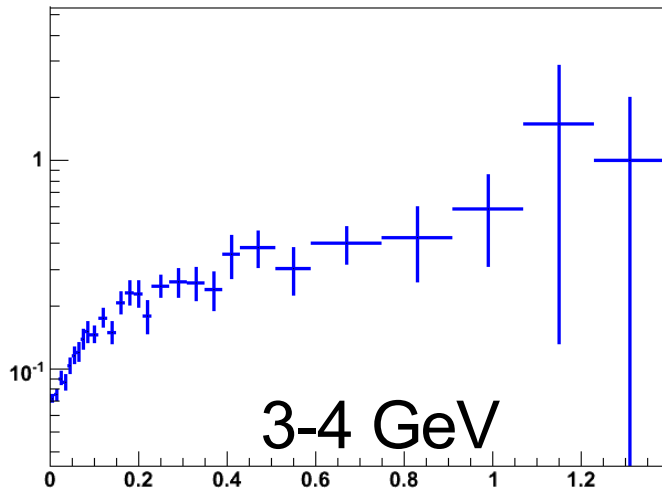
B/C ratio vs DCA from Geant info (fkin)

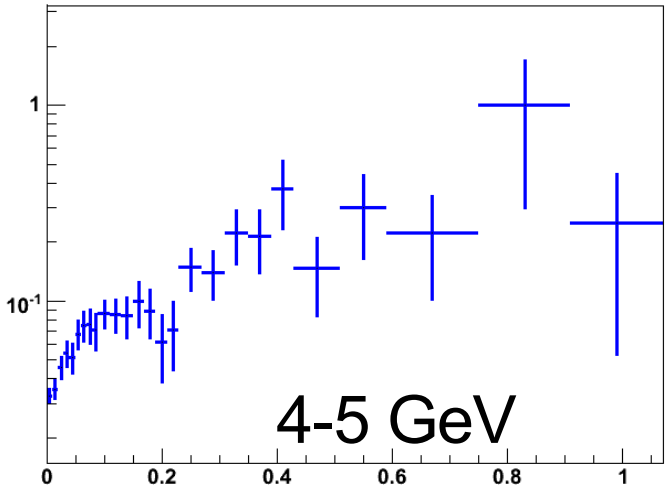
This is what we can get with a perfect detector

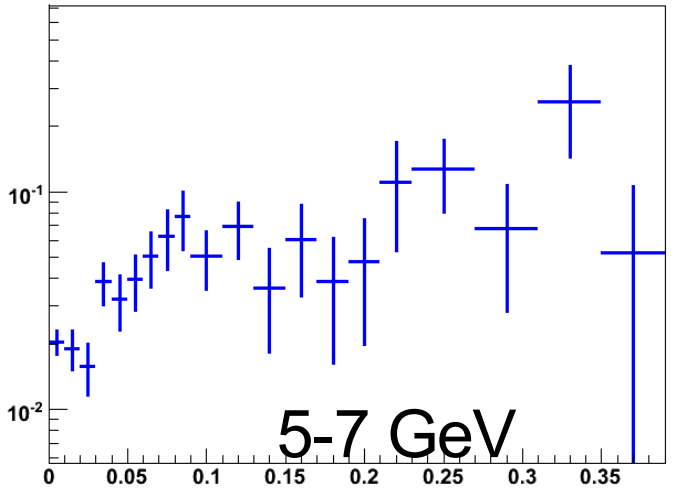








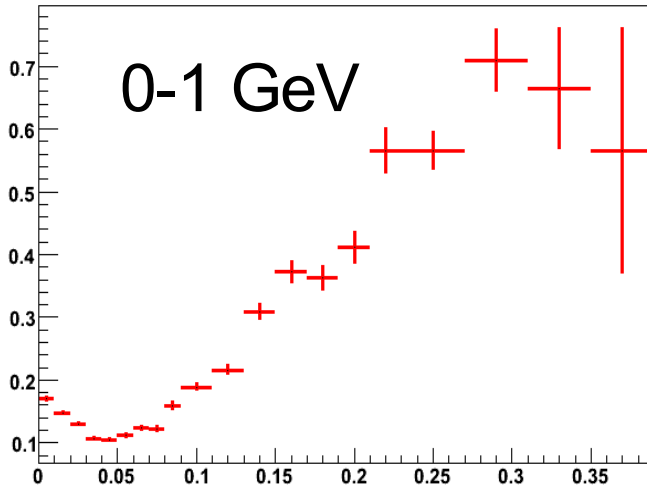


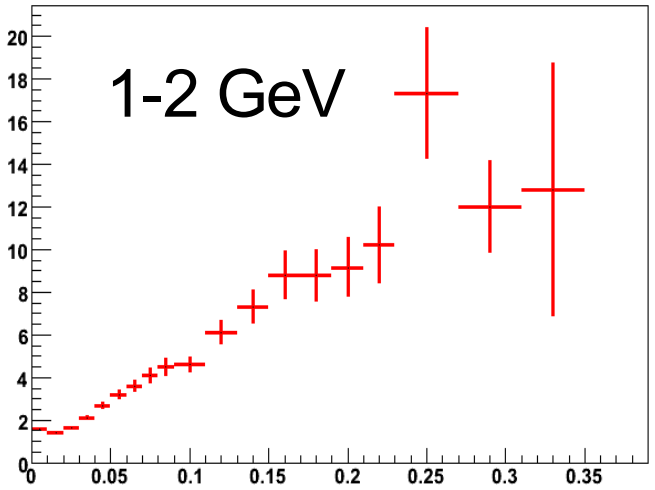


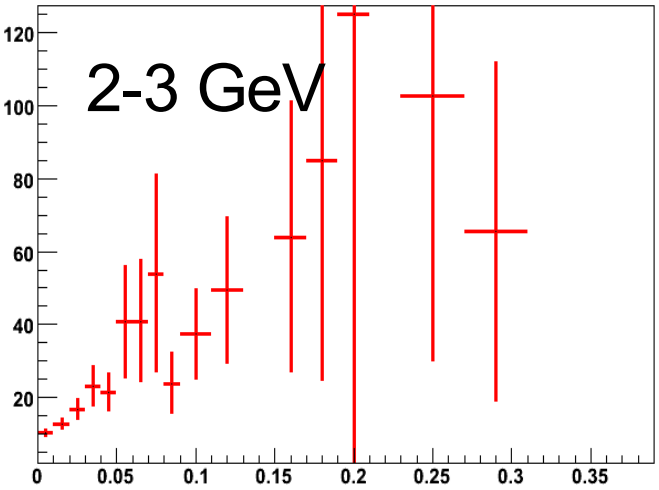
These plots are NOT properly normalized, DCA in cm

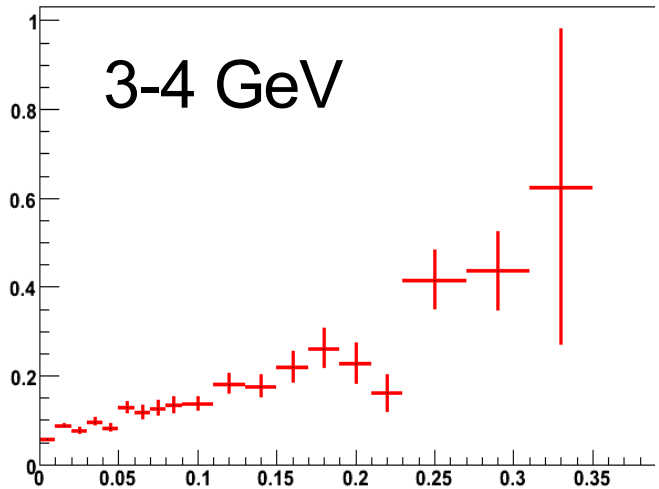
B/C ratio vs DCA from SVX two pixel layers

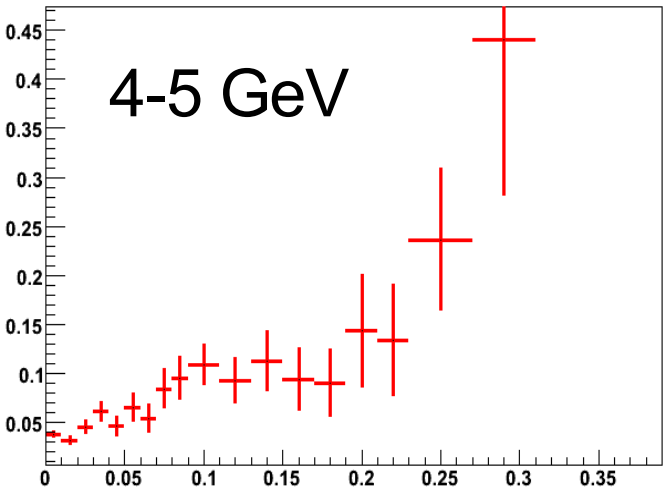
SVX clusters are associated using global tracking (cgl).

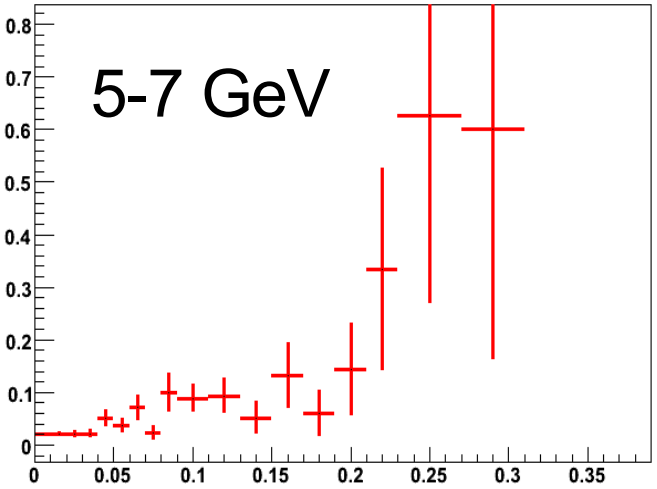












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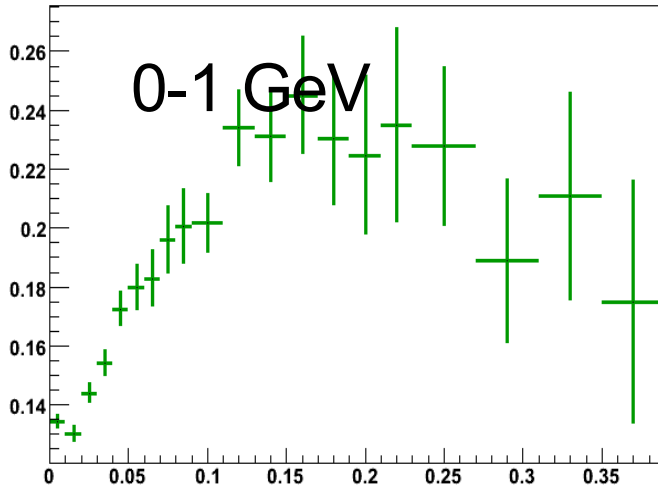
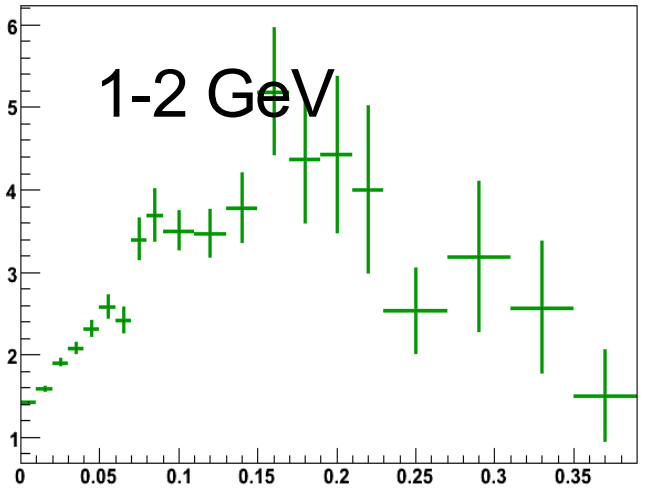
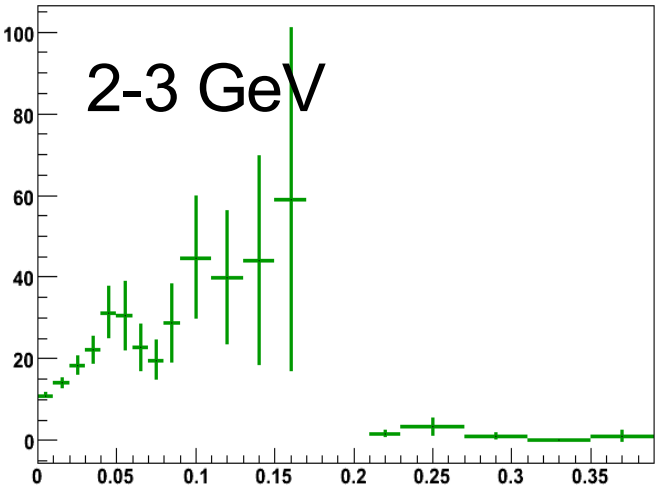
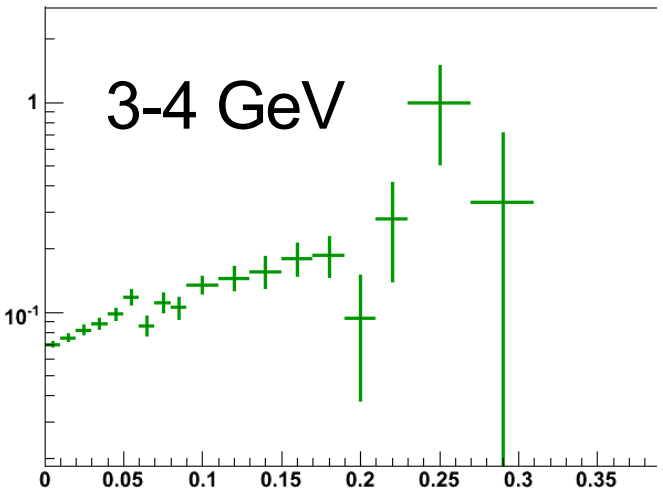
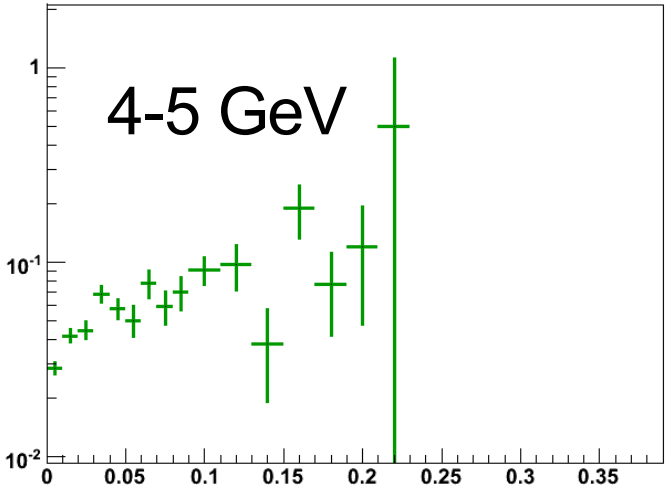
B/C ratio vs DCA from KalFit

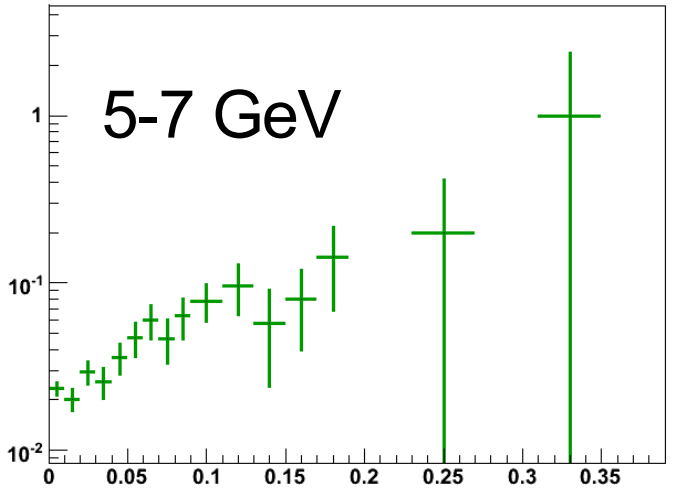












These plots are NOT properly normalized, DCA in cm

Conclusions (c/b separation)

- Both approaches work

- No high DCA entries in my study (cgl problem?)

- Separation is worse at high P_T. Is this because of Lorentz boost?

backups

D and B mesons from PYTHIA

- Single D and B mesons from PYTHIA, decaying to electrons.
- D^0, D^+, D^{--}, and B^0, B^+, and B^{--} only were used.
- Two data sets for D mesons:
  - ckin(3)=0. (default); for this sample b/c ratio is properly normalized
  - ckin(3)=10. For high P_T range
- Full simulation and reconstruction

Expected electron yield (electrons from B scaled down) after 3σ DCA cut:
The plot corresponds to ~1.7B min. bias pp events (~1% of run5pp)